

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



WPR22FA195

SUMMARY OF FIELD AND FOLLOW-UP EXAMINATION NOTES

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A. ACCIDENT

Location: Lucerne Valley, California
Date: June 2, 2022
Time: 1130 Pacific daylight time (PDT)
Airplane: N6366M

B. SUMMARY OF FIELD AND FOLLOW-UP EXAMINATION NOTES

IIC Eleazar Nepomuceno
National Transportation Safety Board
Federal Way, Washington

C. SUMMARY

On June 2, 2022, about 1130 Pacific daylight time (PDT), a Fred Meyer 360 Hornet (photo 1), N6366M, was substantially damaged when it was involved in an accident near Lucerne Valley, California. The pilot was fatally injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.



Photo 1. View of accident airplane exemplar (photo courtesy of International Aerobatic Club)

According to the pilot's wife, the pilot departed Big Bear Lake City Airport (L35) Big Bear City, California about 1115 for a local flight to perform aerobatic maneuvers. Witnesses near the accident site reported that the pilot was performing aerobatic maneuvers over the valley. About 1130, several witnesses reported that after multiple maneuvers, prior to impact, the airplane dove with level wings and disappeared from their view behind a 60 ft tree. Shortly after, the witness heard a loud "thud" and immediately called 911.

According to preliminary radar data (Figure 1), the pilot departed L35 and travelled northbound towards Lucerne Valley. Just short of Highway 247, the airplane maneuvered to the east and flew parallel the highway. The pilot maneuvered to the

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west and the last radar hit was located about 1 mile east of the accident site (Figure 2).

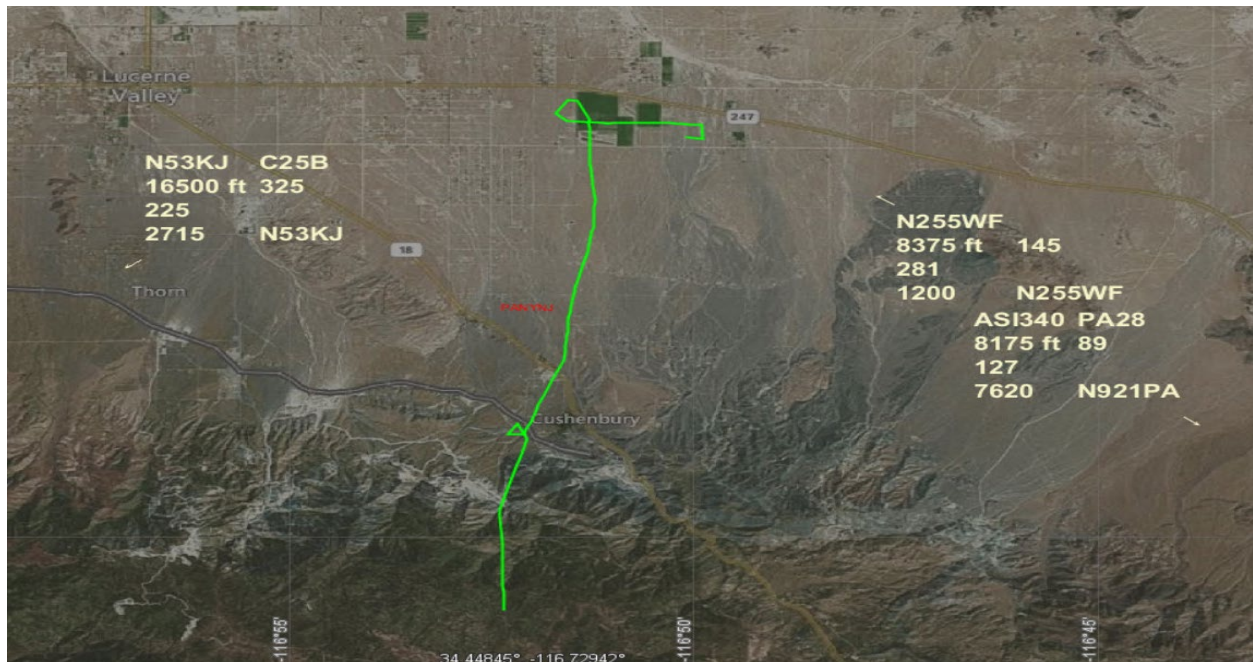


Figure 1. View of preliminary radar data of N6366M flight track

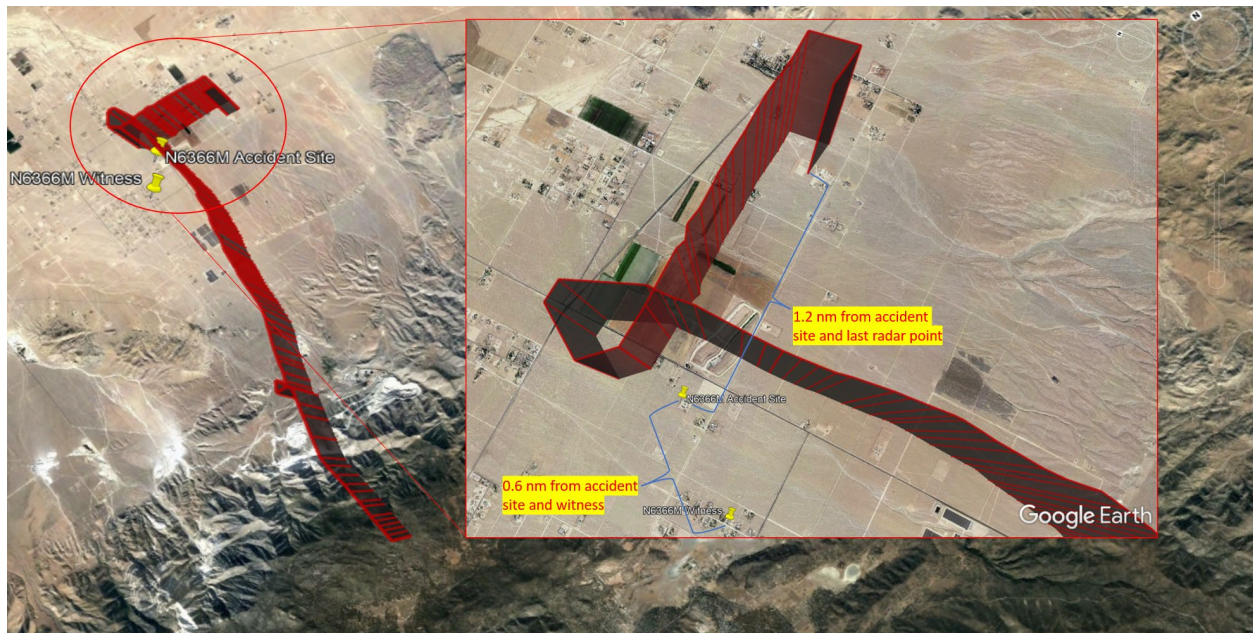


Figure 2. View of ADSB data plot over google earth

D. DETAILS OF THE INVESTIGATION

1.0 Accident Site

The airplane impacted a dirt field within a residential property 10 nautical miles north of L35 at an elevation of 3,000 ft mean sea level. The wreckage debris path was about 200 ft long and oriented on a magnetic heading of 280°. Figure 3 shows the highly fragmented wreckage and debris path, consistent with a high energy impact.



Figure 3. View of main wreckage site

The airplane came to rest on top of a chain linked fence on a magnetic heading of about 360°. The first point of impact (FPI) was identified by a 10 ft long, 6 ft wide, and 2 feet deep crater and a damaged statue. The FPI contained pieces of the right wing, right aileron, wooden propellers, and fuel lines. Ground scars at the accident site and damage to the airplane were consistent with the airplane impacting terrain in a steep, nose down and right-wing low attitude. A post-impact fire did not ensue, but fuel odor was present within the main wreckage, consistent with 100LL. All major structural components of the airplane were located within the debris field (figure 4).

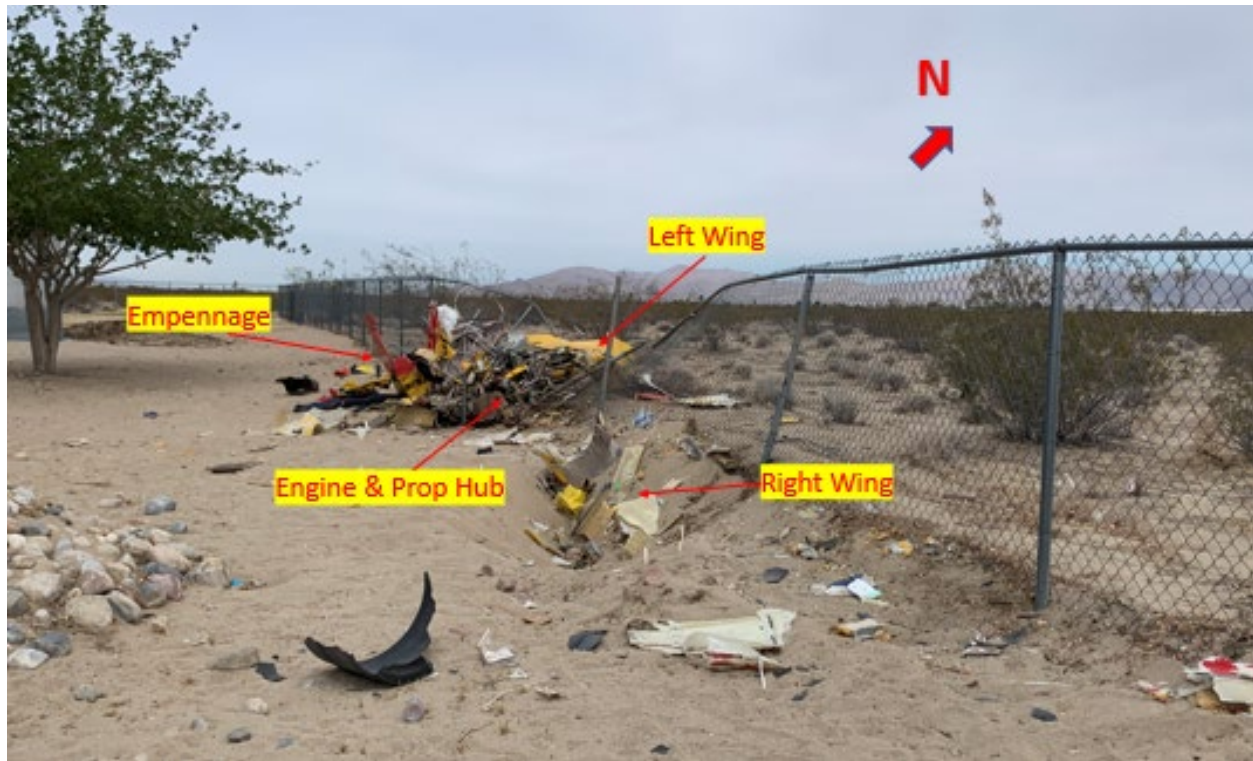


Figure 4. View of airplane wreckage depicting the "4 corners" of the airplane

The forward section of the fuselage and the cockpit tubular truss sustained impact damage. Flight control continuity was confirmed for each primary flight control system to the extent possible, given the initial damage to the push pull tubes and cables due to impact sequence. Continuity was established from the cockpit controls to the left and right aileron bellcrank, right and left elevator, and rudder. The empennage remained attached to the aft fuselage. The aft fuselage sustained compression damage on the left side just forward of the left horizontal stabilizer from impact damage. The left horizontal was unremarkable while the leading edge of the right horizontal sustained impact damage.

The instrument console sustained buckling and compression damage consistent with impact damage. Multiple gauges from the instrument panel were found displaced consistent with impact damage with unidentifiable value readings. Identifiable gauges, switches and control levers/knobs were found placed in the following positions:

- The mixture and throttle control knobs were found in the full forward position.
- The fuel selector lever was found separated and in the left tank position.
- Displaced altimeter found adjacent to the main wreckage with needles at 4,500 msl.
- Displaced air speed indicator was impact damage with unidentifiable value reading.
- Battery sustained damage consistent with impact.

The engine separated from the engine truss. The engine truss remained attached to the fuselage tubular frame. The tubular frame sustained substantial damage consistent from impact with terrain. The carburetor and lower section of the engine, which included the oil sump, were separated from the rest of the engine. The mixture cable remained attached to an impact damaged carburetor. All intake and exhaust tubes were crushed and displaced

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from their corresponding cylinders. The ignition harness was attached to each of its corresponding spark plug. The spark plugs were securely attached at each spark plug port.

The propellor hub remained attached to the engine but sustained impact damage. All three blades were separated from the root and highly fragmented within the wreckage site.

Fuel odor was present at the main wreckage site, consistent with 100 LL fuel. Three fuel caps were located within the main wreckage.

E. DETAILS OF THE EXAMINATION

2.0 Airframe Examination

The fuselage was highly fragmented. The wings were constructed with wood and covered by fabric. The left and right wings were highly fragmented consistent with impact damage. Flight control continuity was confirmed from the cockpit to its corresponding flight surface on the wing structures. All anchor points to the restrained system were recovered and was found to be secured to its attachment point in the airframe. The empennage remained mostly intact and control continuity was confirmed from the cockpit to the elevator and rudder surfaces.

3.0 Engine Examination

Manufacturer: Lycoming
Model No. AEIO-360-A1E6
Serial Number: L-26804-51A



Figure 5. View of engine prior to teardown examination

The engine (figure 5) was a four-cylinder, air-cooled, direct drive, horizontally opposed, normally aspirated (fuel injected), internal combustion engine rated at 200 hp @2700 rpm. The engine and portions of the engine separated from the airframe. The forward section of the crankcase sustained significant impact damage. The magnetos, fuel injection servo, fuel pump, and started had separated from its respective mounting pad, consistent with impact damage.

Removal of the top spark plugs (figure 6) revealed that the electrodes were mechanically undamaged, according to Champion Spark Plugs Check-A-Plug chart AV-27; each electrode displayed coloration consistent with normal operation.



Figure 6. View of top spark plug electrodes

Rotation of the crankshaft could not be completed due to impact damage to the engine case and the nose of the crankshaft. All rocker covers were removed, and the valve train appeared to be free of any pre-impact mechanical failures or malfunctions. Examination of the cylinders by a lighted borescope revealed that the internal combustion chambers and lower spark plugs remained mechanically undamaged and there was no evidence of foreign object ingestion. The valves were intact and

undamaged. There was no evidence of valve to piston face contact observed. The gas path and combustion signatures observed at the spark plugs, combustion chambers and exhaust system components displayed coloration consistent with normal operation. Removal of cylinders no. 2 and no.4 confirmed that the crankshaft and camshaft and its respective cam lobes had no evidence of lubrication depravation, contamination, or foreign object damage (figure 7). The crankshaft and attached connecting rods remained free of heat distress. There were no signatures or conditions observed consistent with any pre-mishap catastrophic mechanical malfunction. The camshaft was intact and each of the cam lobes exhibited their characteristic elliptical shape.

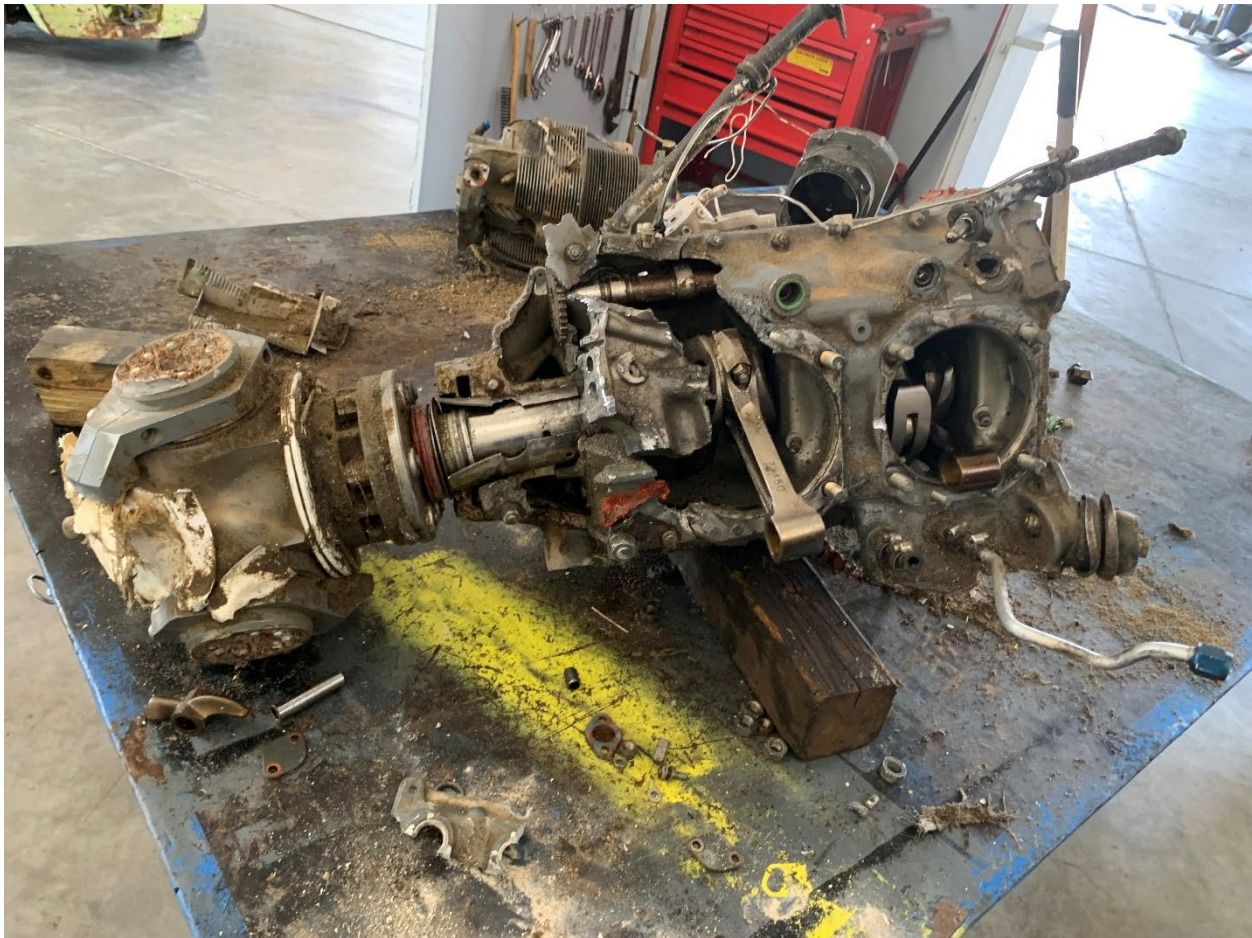


Figure 7. View of engine after cylinder removal

The accessory case was removed. The accessory gears including the crankshaft gear, bolt and dowel were intact and remained undamaged by any pre-impact malfunction. The left and right magnetos had sustained impact energy damage and was displaced from the mounting pad. The magnetos sustained varying degrees of damage that rendered the unit inoperative and therefore, could not be functionally tested. Magneto to engine timing could not be ascertained. The ignition harness had sustained varying degrees of damage by impact energy and was not tested. The

starter was displaced from the engine and destroyed. The subject starter was not examined.

The oil suction screen and oil filter were destroyed by impact. There was no evidence of pre-mishap metal contamination observed at the rocker box areas when opened for examination.

4.0 Propeller Examination

Manufacturer: MT Propeller
Model Number: MTV-12-B-C
Serial Number: 92058

The three bladed constant speed propeller remained attached at the crankshaft flange. The spinner was liberated from the propeller. The wood/composite propeller blades had been sheared off at the propeller hub. The propeller governor remained secure at the mounting pad which had been liberated from the engine consistent with the absorption of impact energy. The control arm had been impact separated from the governor.

5.0 Fuel/Fuel System

The various fuel supply lines at the engine and firewall were subjected to the forces of impact energy and had become displaced at their respective fittings when the engine separated from the airframe and compromised the fuel system. There was no fuel observed.

The fuel injection servo was displaced from the engine and the portion that remained attached at the mounting pad was secure. The fracture surface signatures were consistent with overload. The throttle/mixture controls were found securely attached at their respective control arm of the servo. The castellated nut and cotter pin remained secure and the serrated interface at the throttle/mixture arm remained securely mated. The plug on the side of the injector body was secure with the safety wire in place.

The fuel flow divider (aka: spider) remained secure at the mounting bracket situated at the top of the engine. The impact damaged fuel lines remained secure at each flow divider fitting and fuel injector at each cylinder. The flow divider was disassembled. There was no evidence of internal mechanical malfunction or obstruction to fuel flow. The diaphragm remained pliable, intact, and undamaged.

The fuel injection nozzles remained secure at each cylinder with the respective fuel line attached. The nozzles were removed and examined. The nozzles remained free of visible contamination or obstruction to flow. The fuel pump was displaced from the

engine. The portion of mounting flange remained secure at the mounting pad. The fracture surfaces exhibited signatures consistent with overload.

6.0 Pilot Information

Witnesses reported that the pilot was well-versed in aerobatic maneuvers and as part of his routine, would fly north of the departure airport over unpopulated area and perform aerobatic maneuvers about 4-5 times a week.

7.0 Witness Information

Witnesses on the ground, near the accident site, reported observing the airplane engaged in aerobatic maneuvers prior to witnessing the airplane in an extremely nose down attitude before impacting terrain.

Submitted by:

Eleazar Nepomuceno
Aviation Accident Investigator